IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant	: Lance W. Russell	Art Unit	: 2153
Serial No.	: 09/888,544	Examiner	: Barqadle, Yasin M.
Filed	: June 25, 2001	Confirmation No.:	9456
Title	: Routing Meta Data for Network File Access		

Commissioner for Patents
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AMENDED APPEAL BRIEF

I. Real Party in Interest

The real party in interest is Hewlett-Packard Development Company, L.P., a Texas Limited Partnership having its principal place of business in Houston, Texas.

II. Related Appeals and Interferences

Appellant is not aware of any related appeals or interferences that will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

III. Status of Claims

Claims 1, 2, 4-6, 12, 13, 19, and 21-27 are pending.

Appellant appeals all rejections of the claims 1, 2, 4-6, 12, 13, 19, and 21-27.

CERTIFICATE OF TRANSMISSION

I hereby certify that this document is being transmitted to the Patent and Trademark Office via electronic filing.

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IV. Status of Amendments

The Amendment that was filed on September 6, 2005, has been entered and acted upon by the Examiner.

No amendments were filed after the final Office action dated December 2, 2005.

V. Summary of Claimed Subject Matter

The aspect of the invention claimed in independent claim 1 is a method of accessing a data file in a distributed computing environment. In response to a request from a client site for access to a data file stored in one or more physical storage systems at a source site, physical address meta data and routing meta data are sent from the source site to the client site (see, e.g.: Fig. 3, block 92; page 9, lines 12-15; FIG. 4; and page 9, line 21 - page 10, line 2). The physical address meta data includes physical addresses of one or more logical blocks of the data file in the one or more physical storage systems (see, e.g., page 9, lines 16-22). The routing meta data includes one or more node addresses along one or more network routes between the client site and the source site (see, e.g., page 9, lines 22-30).

The aspect of the invention claimed in independent claim 12 is a system for accessing a data file in a distributed computing environment (see, e.g., FIG. 1, which shows the source site 14 is part of the distributed computing system 10). The system includes a file system of a source site configured to manage access to one or more logical file blocks of a data file stored in one or more physical storage systems of the source site (see, e.g.: file system 26 in FIG. 1; page 5, lines 27-29; page 6, lines 29-30; and page 7, lines 1-8). In response to a request from a client site for access to the data file, the file system sends from the source site to the client site physical address meta data and routing meta data (see, e.g.: FIG. 3, block 92; page 9, lines 12-15; FIG. 4; and page 9, line 21 - page 10, line 2). The physical address meta data includes physical addresses of one or more logical blocks of the data file in the one or more physical storage systems (see, e.g., page 9, lines 16-22). The routing meta data includes one or more node addresses along one or more network routes between the client site and the source site (see, e.g., page 9, lines 22-30).

The routing meta data allows the client site to optimize the selection of routes over which the data file is accessed based upon client-specific criteria (e.g., packet delay and fragmentation criteria) (see, e.g., page 7, lines 4-8). In this way, embodiments in accordance with the inventive subject matter defined by independent claims 1 and 12 can avoid the sub-optimal route selection that may occur with table-based network routing protocols in which routing decisions are made based upon network traffic considerations, rather than file system considerations (see, e.g., page 7, lines 8-11). In addition, embodiments in accordance with the aspect of the invention defined in independent claims 1 and 12 can avoid the network overhead (e.g., file system access to routing tables in addition to normal network traffic access) that otherwise would be required to select optimal routes using such table-based network routing protocols (see, e.g., page 7, lines 11-14).

FIG. 1 shows a distributed computing system 10 that includes a client site 12 that is connected to a source site 14 through two intermediate networks 16, 18 (see page 5, line 25 - page 6, line 28 of the specification). Each of the client site 12 and the source site 14 includes a respective client system 20, 22, a respective file system 24, 26, a respective meta data system 28, 30, a respective block server 32, 34, and one or more respective physical storage systems 36, 38. In the illustrated embodiment, the physical storage systems 38 of the source site 14 contain one or more data files that are accessible by the client site 12 (see page 6, line 25 - page 7, line 1 of the specification).

FIG. 3 shows how the source site 14 handles file access requests from the client site 12 in accordance with the aspect of the invention defined in independent claims 1 and 12. In response to a request from the client site 12 for access to a data file stored in the physical storage systems 38 at the source site 14, the source file system 26 passes the file request to the source meta data system 30 (FIG. 3, block 82). The source meta data system 30 passes to the source file system 26 meta data that is associated with the requested data file (FIG. 3, block 84; see page 9, lines 4-7 of the specification). This meta data includes access protection meta data, physical address meta data, and routing meta data (see page 9, lines 6-7 of the specification). After confirming that the client site 12 is authorized to access the requested data file (FIG. 3, blocks 86-88), the source file system 26 sends to the client site 12 a reply containing meta data associated with the logical file blocks of the requested data file (FIG. 3, block 92; see page 9, lines 12-15 of the

specification). This meta data includes the physical address meta data and the routing meta data (see page 9, lines 12-15).

With reference to FIG. 2, "the client file system 24 selects an optimal network route to source site 14 based upon routing meta data associated with the physical address information for the requested data file (step 62)" (page 7, line29 - page 8, line 1 of the specification). The client file system 24 may select a network route to source site 14 based upon packet delay and fragmentation criteria, such as the load conditions, transmission characteristics, and MTU sizes of intermediate networks 16, 18 (see page 8, lines 1-6 of the specification). "Therefore, even if the file system uses the same routing algorithms as the general networking code to determine optimal routes, the file system may select a different path than the general network code" (page 8, lines 6-9). "After selecting an optimal network route over which to access the requested data file (step 62), client file server 24 accesses the logical file blocks for the requested data file through source block server 34 and returns the logical file blocks to the client application program (step 64)" (page 8, lines 9-13).

The aspect of the invention claimed in independent claim 19 is a machine-readable medium encoded with a data structure for accessing a data file in a distributed computing environment (see, e.g.: physical storage system 38 in FIG. 3; page 6, line 29, through page 7, line 1; data structure 100 in FIG. 4; and page 9, lines 16-18). The data structure includes physical address meta data and routing meta data (see, e.g., page 9, lines 21-24). The physical address meta data includes physical addresses of one or more logical blocks of the data file in one or more physical storage systems of a source site (see, e.g., page 9, lines 16-22). The routing meta data includes one or more node addresses along one or more network routes between a client site and the source site (see, e.g., page 9, lines 22-30).

FIG. 4 shows a table-based data structure 100 that is stored at the source site 14 by the source meta data system 30 (see page 9, lines 16-18, of the specification). The stored data structure 100 includes physical address meta data and routing meta data in accordance with the aspect of the invention defined in independent claim 19. The data structure 100 includes a table row for each logical file block of a data file (see page 9, lines 18-19, of the specification). The data files may be identified by file identifiers 102 (File ID) and the logical file blocks may be identified by block numbers 104 (Block No.) (see page 9, lines 19-21, of the specification). The

physical addresses 106 of the logical file blocks may be specified by disk number, sector number, as well as data offset and data size information (see page 9, lines 21-22, of the specification). The routing meta data 108 contains information relating to the network routes connecting client site 12 and source site 14 (see page 9, lines 22-24, of the specification). In some embodiments, the routing meta data 108 may contain addresses for each node along each of the network routing paths between client site 12 and source site 14 (see page 9, lines 24-26, of the specification). In other embodiments, the routing meta data 108 may contain incomplete routing information (e.g., only next hop node addresses from the client site 12 for each of the possible network routes) (see page 9, lines 26-28, of the specification).

VI. Grounds of Rejection to be Reviewed on Appeal

A. Claims 1, 2, 4-6, 12, 13, 19, 23, 24, 26, and 27 stand rejected under 35 U.S.C. § 103(a) over Vahalia (U.S. 2005/0251500) in view of Koyanagi (U.S. 20010013067).

B. Claims 21, 22, and 25 stand rejected under 35 U.S.C. § 103(a) over Vahalia in view of Koyanagi and Kato (U.S. 6,223,249).

VII. Argument

A. Rejection under 35 U.S.C. § 103(a) over Vahalia (U.S. 2005/0251500) in view of Koyanagi (U.S. 20010013067)

The Examiner has rejected claims 1, 2, 4-6, 12, 13, 19, 23, 24, 26, and 27 under 35 U.S.C. § 103(a) over Vahalia (U.S. 2005/0251500) in view of Koyanagi (U.S. 20010013067).

1. Independent claim 1

Claim 1 recites:

> 1. A method of accessing a data file in a distributed computing environment, comprising:

> in response to a request from a client site for access to a data file stored in one or more physical storage systems at a source site, sending from the source site to the client site physical address meta data including physical addresses of one or more logical blocks of the data file in the one or more physical storage systems, and routing meta data comprising one or more node addresses along one or more network routes between the client site and the source site.

The Examiner's rejection of claim 1 under 35 U.S.C. § 103(a) over Vahalia in view of Koyanagi should be withdrawn because neither the cited references, taken alone or in any permissible combination, nor the knowledge generally available at the time of the invention teaches or suggests a method of accessing a data file that includes sending from a source site to a client site routing meta data comprising one or more node addresses along one or more network routes between the client site and the source site in response to a request from the client site for access to a data file stored in one or more physical storage systems at the source site.

2. The Examiner's stated reasons for rejecting independent claim 1

The Examiner has stated that Vahalia teaches a method of accessing a data file that meets every element recited in claim 1 except Vahalia "does not explicitly show a routing meta data comprising a next hop node along one or more network routes between the client site and the source site (see page 5, lines 7-9, of the Office action).[1]

In support of this position, the Examiner has taken the position that in ¶ 56 Vahalia teaches "in response to a request from a client site for access to a data file stored in one or more physical storage systems at a source site, sending from the source site to the client site physical address meta data including physical addresses of one or more logical blocks of the data file in the one or more physical storage systems" (see page 3, line 20 - page 4, line 5, of the Office action). The Examiner also has taken the position that the feature of claim1 corresponding to "in response to a request from a client site for access to a data file stored in one or more physical storage systems at a source site, sending from the source site to the client site ... routing meta" is

[1] As used herein, "the Office action" refers to the Office action dated July 11, 2006.

disclosed in ¶ 15 of Vahalia (see page 4, line 5 - page 5, line 2, of the Office action, where the Examiner has quoted substantially all of ¶ 15 of Vahalia).

In an effort to make-up for the stated failings of Vahalia's disclosure, the Examiner has stated that (see page 5, line 10 - page 6, line 5, of the Office action; emphasis added):

> Nonetheless, this feature is well known in the art and would have been an obvious modification of the system disclosed by Vahalia, as evidenced by Koyanagi et al USPN. (20010013067).
>
> In analogous art, Koyanagi whose invention is about a data transmission apparatus for transmitting data received from a user terminal device through a plurality of networks to a destination, the user terminal device executing communication using an Internet protocol. The data transmission apparatus includes a routing table storing information relating a destination address of the data and addresses of the plurality of networks, discloses a routing table storing information relating a destination address including next hop node (figs. 5B, fig. 6 and figs.24A-C). Giving the teaching of Koyanagi, a person of ordinary skill in the art would have readily recognized the desirability and the advantage of modifying Vahalia by employing the routing system of Koyanagi to provide a method of selecting an appropriate network based on static and dynamic information about a plurality of networks, thereby enabling data transmission through the appropriate network.

Thus, the Examiner's position is that: Koyanagi discloses a data transmission apparatus that includes a routing table "storing information relating a destination address including next hop node;" one skilled in the art would have found it obvious to modify Vahalia's teachings to employ Koyanagi's data transmission apparatus ("routing system"); and such a modification would result in the invention defined in independent claim 1. In short, the Examiner's conclusion of obviousness is based on the contention that one skilled in the art would have found it obvious to provide a data transmission apparatus of the type discloses in Koyanagi, which stores "information relating a destination address including next hop node," at some unspecified location within an unspecified one of the embodiments disclosed in Vahalia.

3. Appellant's rebuttal

Appellant's rebuttal to the Examiner's rejection of independent claim 1 is presented below in the following sections:

(a) Overview of Vahalia's disclosure

(b) The Examiner's characterization of Vahalia's teachings is incorrect

(c) The Examiner has not established a *prima facie* case of obviousness

(d) The cited references, taken either along or in any permissible combination, do not teach or suggest the inventive subject matter defined in claim 1

(e) Conclusion of the rebuttal to the Examiner's rejection of independent claim 1

a. Overview of Vahalia's disclosure

Vahalia discloses a network file server architecture that allows shared data access to files stored in a file system. Vahalia describes his invention in the context of a prior art file server 20, which is shown in FIG. 1. The file server 20 allows each client 26, 27 to access the same read/write file in a file system 24 through two data movers 21, 22. Each data mover 21, 22 performs file locking management and mapping of the network file to logical blocks of storage in the cached disk storage 25 and moves data between the client and storage (see ¶ 6). Each data mover 21, 22 provides at least one network port for servicing client requests (see ¶ 7). "The cached disk storage 25 is configured so that the file system 23 is accessible only through the data port connected to the first data mover 21 and so that the file system 24 is accessible only through the data port connected to the second data mover 22" (¶ 9). In the prior art file server 20, the clients 26, 27 communicate with the data movers 21, 22 using the NFS protocol (see ¶ 12).

For illustrative purposes assume that the file system 23 contains a give read/write file. The data mover 21, which owns (i.e., has exclusive access to) the file system 23, provides the client 26 with access to the given read/write file by placing a lock on the file, accessing the file in the file system 23, and streaming the read/write data to the client 26 (see ¶ 10). The data mover

22, on the other hand, provides the client 27 with access to the given read/write file by acting as a proxy router that forwards NFS data packets from the client 27 to the data mover 21 (see ¶ 48).

By "using a data bypass path around the data mover that owns the file system during transmission of read/write data," Vahalia's invention provides significant improvement in data access time compared to the prior art file server 20 (¶ 50). In accordance with Vahalia's teachings, the data bypass path is implemented by a "high-speed data link," which is a term that Vahalia consistently uses to refer to a dedicated, point-to-point link that is designed for the high-speed exchange of read/write data (see, e.g., ¶ 11, where Vahalia refers to the dedicated, point-to-point read/write data link between the data movers 21, 22 as a "high-speed data link").

It was well-known in the art of network communications at the time the invention was made that physical addresses conventionally are not used when transmitting frames over point-to-point communication links because there is only one possible destination for each transmission. In addition, host addresses conventionally are not assigned to the nodes of a point-to-point communications link. Although IP routing tables may use arbitrary values as next-hop addresses for the nodes of a point-to-point communications link, such values are ignored by both IP and the point-to-point hardware interfaces of these nodes. Vahalia does not teach or suggest anything that contradicts this well known information about point-to-point communications links.

A detailed analysis of the subject matter described in Vahalia, including the paragraphs (i.e., ¶¶ 81-89) cited by the Examiner, can be found in §§ VII.A.3 and VII.A.4 on pages 6-13 of the Appeal Brief dated May 5, 2006, the entirety of which is incorporated herein by reference.

b. The Examiner's characterization of Vahalia's teachings is incorrect

The Examiner has taken the position that the feature of independent claim 1 corresponding to "in response to a request from a client site for access to a data file stored in one or more physical storage systems at a source site, sending from the source site to the client site ... routing meta" is disclosed in ¶ 15 of Vahalia (see page 4, line 5 - page 5, line 2, of the Office action). Contrary to the Examiner's position, however, ¶ 15 does not teach this feature of claim 1.

In ¶ 15, Vahalia discloses that a client is connected to a server by an IP data link and is additionally connected to data storage by a high-speed data link that bypasses the server. In accordance with the method described in ¶ 15, the client uses a file access protocol to obtain from the server metadata specifying the data storage locations of a requested data file. The client produces a data access command from the metadata obtained from the server. The client then sends the data access command to the data storage over the high-speed data link using a high-speed data protocol.

On its face, ¶ 15 does not disclose "in response to a request from a client site for access to a data file stored in one or more physical storage systems at a source site, sending from the source site to the client site ... routing meta," as recited in claim 1. In particular, the metadata that is sent to the client by the server only corresponds to the physical addresses of the logical blocks of the requested data file; this metadata does not include any routing data whatsoever, much less "routing meta data comprising one or more node addresses along one or more network routes between the client site and the source site," as recited in claim 1. Indeed, Vahalia explains that (¶ 52):

> The term metadata refers to information about the data, and the term metadata is inclusive of file access information and file attributes. The file access information includes the locks upon the files or blocks of data in the files. The file attributes include pointers to where the data is stored in the cached disk array.

Thus, the metadata sent by Vahalia's server does not include routing metadata comprising one or more node addresses along one or more network routes between the client and the server. Moreover, the inclusion of such routing metadata in the transmission from the server in response to the client's file access request would not serve any useful purpose whatsoever in the context of Vahalia's file server system because physical addresses and IP addresses are ignored in communications over point-to-point, high-speed data links in accordance with the knowledge that was generally available at the time the invention was made.

For the reasons explained above, contrary to the Examiner's stated position, Vahalia does not disclose "in response to a request from a client site for access to a data file stored in one or

more physical storage systems at a source site, sending from the source site to the client site ... routing meta" (see page 4, line 5 - page 5, line 2, of the Office action).

c. The Examiner has not established a *prima facie* case of obviousness

As explained in detail below, the Examiner has not established a *prima facie* case of obviousness with respect to independent claim 1 for the following reasons:

(i) The Examiner has not shown that when combined the cited references teach or suggest all the claim limitations; and

(ii) The Examiner has not pointed to any suggestion or motivation, either in the cited references themselves or in the knowledge generally available, that would have led one skilled in the art to modify the references or to combine reference teachings.

i. The Examiner has not shown that when combined the cited references teach or suggest all the claim limitations

In the explanation given by the Examiner in support of his conclusion that Vahalia and Koyanagi render the inventive subject matter defined in claim 1 obvious, the Examiner has not shown that when combined Vahalia and Koyanagi teach or suggest all of the claim limitations as required in order to establish a *prima facie* case of obviousness under 35 U.S.C. § 103 (see, e.g., MPEP § 706.02(j)).

The implication of the Examiner's statement in support of the rejection of independent claim 1 is that modifying Vahalia's teaching by employing the routing system of Koyanagi would result in a method of accessing a data file that included each and every feature recited in independent claim 1 (see page 3, line 17 - page 6, line 5, of the Office action). Contrary to this implication, however, "employing the routing system of Koyanagi to provide a method of selecting an appropriate network based on static and dynamic information about a plurality of networks, thereby enabling data transmission through the appropriate network" (see page 5, line 22 - page 6, line 5 of the Office action; emphasis added) in the file server systems disclosed in

Vahalia does not make-up for the acknowledged failure of Vahalia to "explicitly show a routing meta data comprising a next hop node along one or more network routes between the client site and the source site" (see page 5, lines 7-9, of the Office action).

In particular, the "data transmission" that is enabled by Koyanagi's data transmission apparatus corresponds to the transmission of input data received from a user terminal device (see, e.g., ¶¶ 14 and 48, and FIG. 4 of Koyanagi). The input data that is received by the user terminal device does not include "routing meta data comprising one or more node addresses along one or more network routes between the client site and the source site." In addition, Koyanagi's data transmission apparatus does not send the input data back to the user terminal; instead, the data transmission apparatus sends the input data to a specified destination (see, e.g., ¶ 49 of Koyanagi).

Consequently, the transmission of input data received from a user terminal device "through the appropriate network" in accordance with Koyanagi's teachings would not result in "sending from the source site to the client site ... routing meta," as recited in claim 1. Therefore, on its face, the Examiner's unspecified modification of Vahalia's teachings would not teach or suggest all of the claim limitations of independent claim 1.

For at least these reasons, the Examiner has not established a *prima facie* case for the obviousness of independent claim 1 and the rejection of claim 1 under 35 U.S.C. § 103(a) over Vahalia and Koyanagi should be withdrawn.

ii. The Examiner has not pointed to any suggestion or motivation, either in the cited references themselves or in the knowledge generally available, that would have led one skilled in the art to modify the references or to combine reference teachings

As explained above, the Examiner's conclusion of obviousness is based on the contention that one skilled in the art would have found it obvious to provide a data transmission apparatus of the type discloses in Koyanagi, which stores "information relating a destination address including next hop node," at some unspecified location within an unspecified one of the embodiments disclosed in Vahalia. The Examiner, however, has not pointed to any suggestion or motivation, either in the cited references themselves or in the knowledge generally available,

that would have led one skilled in the art to modify the references or to combine reference teachings in any particular way.

First, the Examiner has not explained in any way whatsoever his proposed modification of Vahalia that would result in the inventive subject matter defined by independent claim 1. The only hint of the modification of Vahalia's teachings envisioned by the Examiner is contained in the following statement: "Giving the teaching of Koyanagi, a person of ordinary skill in the art would have readily recognized the desirability and the advantage of modifying Vahalia by employing the routing system of Koyanagi to provide a method of selecting an appropriate network based on static and dynamic information about a plurality of networks, thereby enabling data transmission through the appropriate network" (see page 5, line 22 - page 6, line 5 of the Office action; emphasis added). This statement, however, does not explain how Vahalia would be modified to employ the routing system of Koyanagi. For example, the Examiner has not indicated which of Vahalia's embodiments would be modified and how Koyanagi's data transmission apparatus would be employed in that embodiment. Clearly, it is not possible to say that it would have been obvious to one skilled in the art to modify Vahalia's teachings without specifying the details of that modification. In effect, without specifying the details of the modification of Vahalia's teachings that is envisioned by the Examiner, the Examiner's basis for rejecting claim 1 amounts to no more than the impermissible "obvious to try" rationale, which is not the proper standard under 35 U.S.C. § 103 (see MPEP § 2145.X.B).

Second, the only support given by the Examiner for his conclusion that such a modification would have been obvious is as follows (see page 5, line 13 - page 6, line 5, of the Office action; emphasis added):

> In analogous art, Koyanagi whose invention is about a data transmission apparatus for transmitting data received from a user terminal device through a plurality of networks to a destination, the user terminal device executing communication using an Internet protocol. The data transmission apparatus includes a routing table storing information relating a destination address of the data and addresses of the plurality of networks, discloses a routing table storing information relating a destination address including next hop node (figs. 5B, fig. 6 and figs.24A-C). Giving the teaching of Koyanagi, a person of ordinary skill in the art would have readily recognized the desirability and the advantage of modifying Vahalia

> by employing the routing system of Koyanagi to provide a method of selecting an appropriate network based on static and dynamic information about a plurality of networks, thereby enabling data transmission through the appropriate network.

However, neither the fact that Koyanagi is analogous art nor the fact that Koyanagi's data transmission apparatus ("routing system") has a routing table that stores a destination address including next hop node constitutes a showing of a suggestion or a motivation, either in the cited references themselves or in the knowledge generally available, that would have led one skilled in the art to modify the references or to combine reference teachings.

In summary, the Examiner has not pointed to any suggestion or motivation, either in the cited references themselves or in the knowledge generally available, that would have led one skilled in the art to modify the references or to combine reference teachings as required in order to establish a *prima facie* case of obviousness under 35 U.S.C. § 103 (see, e.g., MPEP § 706.02(j)). Therefore, the rejection of claim 1 under 35 U.S.C. § 103(a) over Vahalia and Koyanagi should be withdrawn for at least these additional reasons.

d. The cited references, taken either alone or in any permissible combination, do not teach or suggest the inventive subject matter defined in claim 1

As explained above, the Examiner has not established a *prima facie* case for the obviousness of independent claim 1 and, therefore, the rejection of claim 1 under 35 U.S.C. § 103(a) over Vahalia and Koyanagi should be withdrawn on this alone.

The Examiner's rejection of independent claim 1 also should be withdrawn because, even putting to one side the fact that a *prima facie* case of obviousness have not been established, the cited references, taken either alone or in any permissible combination, do not teach or suggest the inventive subject matter defined in claim 1.

First, as explained above in § VII.A.3.b, contrary to the Examiner's stated position (see page 4, line 5 - page 5, line 2, of the Office action), Vahalia does not disclose "in response to a request from a client site for access to a data file stored in one or more physical storage systems at a source site, sending from the source site to the client site ... routing meta comprising one or

more node addresses along one or more network routes between the client site and the source site," as recited in claim 1.

Second, contrary to the implication of the Examiner's statement on page 5, line 10 - page 6, line 5, of the Office action, Koyanagi does not make-up for the failure of Vahalia to disclose "in response to a request from a client site for access to a data file stored in one or more physical storage systems at a source site, sending from the source site to the client site ... routing meta comprising one or more node addresses along one or more network routes between the client site and the source site," as recited in claim 1. Indeed, Koyanagi does not teach or suggest anything about sending such routing meta data from the data transmission apparatus to a client site, much less anything about sending such routing meta from a source site to a client site in response to a request from the client site for access to a data file stored in one or more physical storage systems at the source site. To the contrary, Koyanagi only discloses that the data transmission apparatus, which is the subject of his invention, transmits data that is received from a user terminal device to a specified destination (see, e.g., ¶¶ 14 and 49). The routing table that is stored in Koyanagi's data transmission apparatus is used by the data transmission apparatus to determine "the most appropriate path for transmitting the input data" (¶ 48, lines 14-15). Koyanagi does not even hint that the data transmission apparatus transmits the information stored in the routing table to the user terminal device. Indeed, there is no readily apparent useful purpose that would be served by transmitting such information to the user terminal device.

Thus, neither Vahalia nor Koyanagi teaches or suggests "in response to a request from a client site for access to a data file stored in one or more physical storage systems at a source site, sending from the source site to the client site ... routing meta comprising one or more node addresses along one or more network routes between the client site and the source site," as recited in claim 1. Therefore, there is no possible combination of Vahalia and Koyanagi that teaches or suggests this feature of independent claim 1. Since the Examiner has not pointed to any knowledge that was generally available at the time of the invention that would make-up for the failure of Vahalia and Koyanagi to teach or suggest this feature of independent claim 1, the Examiner's rejection of independent claim 1 under 35 U.S.C. § 103(a) over Vahalia and Koyanagi should be withdrawn for these reasons in addition to the reasons explained above.

e. Conclusion of the rebuttal to the Examiner's rejection of independent claim 1

As explained in detail above, the Examiner has not established a *prima facie* case of obviousness for independent claim 1 and the cited references, taken either alone or in any permissible combination, do not teach or suggest the inventive subject matter defined in claim 1.

For at least these reasons, the Examiner's rejection of independent claim 1 under 35 U.S.C. § 103(a) over Vahalia in view of Koyanagi should be withdrawn.

2. Dependent claims 2 and 4-6

Each of claims 2 and 4-6 incorporates the features of independent claim 1 and therefore is patentable over Vahalia and Koyanagi for at least the same reasons explained above.

3. Claims 12, 13, 23, and 24

Independent claim 12 recites features that essentially track the features of independent claim 1 discussed above. Therefore, independent claim 12 is patentable over Vahalia and Koyanagi for at least the same reasons explained above in connection with independent claim 1.

Each of claims 12, 13, 23 and 24 incorporates the features of independent claim 12 and therefore is patentable over Vahalia and Koyanagi for at least the same reasons.

4. Claims 19, 26, and 27

Independent claim 19 recites:

> 19. A machine-readable medium encoded with a data structure for accessing a data file in a distributed computing environment, comprising:
>
> physical address meta data including physical addresses of one or more logical blocks of the data file in one or more physical storage systems of a source site; and

routing meta data comprising one or more node addresses along one or more network routes between a client site and the source site.

In the rejection of independent claim 19, the Examiner has not pointed to any teaching or suggestion in Vahalia and Koyanagi, taken either alone or in any permissible combination, that would have led one skilled in the art at the time the invention was made to the inventive machine-readable medium defined by independent claim 19 (see page 4, line 17 - page 6, line 5 of the Office action). Therefore, the Examiner has not established a *prima facie* case of obviousness for independent claim 19 under 35 U.S.C. § 103 (see, e.g., MPEP § 706.02(j)).

Moreover, Vahalia and Koyanagi, taken either alone or in any permissible combination, teaches or suggests the inventive subject matter recited in claim 19. In particular, neither Vahalia nor Koyanagi teaches or suggests anything about a machine-readable medium encoded with a data structure for accessing a data file in a distributed computing environment that comprises physical address meta data as defined in claim 19 and routing meta data as defined in claim 19. Therefore, there is no possible combination of the cited references that possibly could teach or suggest such an inventive machine-readable medium.

Since the Examiner has not pointed to any knowledge that was generally available at the time of the invention that would make-up for the failure of Vahalia and Koyanagi to teach or suggest each and every feature of independent claim 19, the Examiner's rejection of independent claim 19 under 35 U.S.C. § 103(a) over Vahalia and Koyanagi should be withdrawn

Each of claims 26 and 27 incorporates the features of independent claim 19 and therefore is patentable over Vahalia and Koyanagi for at least the same reasons.

B. Rejection under 35 U.S.C. § 103(a) over Vahalia in view of Koyanagi and Kato (U.S. 6,223,249)

The Examiner has rejected claims 21, 22, and 25 under 35 U.S.C. § 103(a) over Vahalia in view of Koyanagi and Kato (U.S. 6,223,249).

Claim 21 incorporates the features of independent claim 1, claim 22 incorporates the features of independent claim 12, and claim 25 incorporates the features of independent claim

19. Kato does not make-up for the failure of Vahalia to teach the features of independent claims 1, 12, and 19 discussed above. Indeed, the Examiner has cited Kato merely for showing in FIGS. 10A and 10B a block map that arranges data by disk number and sector number (see page 6 of the final Office action). Therefore, claims 21, 22, and 25 are patentable over Vahalia in view of Koyanagi and Kato for at least the same reasons explained above in connection with independent claims 1, 12, and 19.

VIII. Conclusion

For the reasons explained above, all of the pending claims are now in condition for allowance and should be allowed.

Charge any excess fees or apply any credits to Deposit Account No. 08-2025.

Respectfully submitted,

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CLAIMS APPENDIX

The claims that are the subject of Appeal are presented below.

Claim 1 (previously presented): A method of accessing a data file in a distributed computing environment, comprising:

in response to a request from a client site for access to a data file stored in one or more physical storage systems at a source site, sending from the source site to the client site physical address meta data including physical addresses of one or more logical blocks of the data file in the one or more physical storage systems, and routing meta data comprising one or more node addresses along one or more network routes between the client site and the source site.

Claim 2 (previously presented): The method of claim 1, further comprising storing at the source site a data structure comprising the physical address meta data and the routing meta data for one or more logical file blocks of the requested data file.

Claim 3 (canceled)

Claim 4 (previously presented): The method of claim 1, wherein the routing meta data comprises next hop node addresses from the client site for each of the one or more network routes.

Claim 5 (previously presented): The method of claim 1, wherein the routing meta data comprises complete path information from the client site to the source site for each of the one or more network routes.

Claim 6 (original): The method of claim 1, wherein the meta data is sent to the client site in accordance with a routable network protocol.

Claims 7-11 (canceled)

Claim 12 (previously presented): A system for accessing a data file in a distributed computing environment, comprising:

a file system of a source site configured to manage access to one or more logical file blocks of a data file stored in one or more physical storage systems of the source site, wherein, in response to a request from a client site for access to the data file, the file system sends from the source site to the client site physical address meta data including physical addresses of one or more logical blocks of the data file in the one or more physical storage systems, and routing meta data comprising one or more node addresses along one or more network routes between the client site and the source site.

Claim 13 (previously presented): The system of claim 12, wherein the file system is configured to store at the source site a data structure comprising the physical address meta data and the routing meta data for one or more logical file blocks of the requested data file.

Claims 14-18 (canceled)

Claim 19 (previously presented): A machine-readable medium encoded with a data structure for accessing a data file in a distributed computing environment, comprising:

physical address meta data including physical addresses of one or more logical blocks of the data file in one or more physical storage systems of a source site; and

routing meta data comprising one or more node addresses along one or more network routes between a client site and the source site.

Claim 20 (canceled)

Claim 21 (previously presented): The method of claim 1, wherein the physical address meta data comprises physical address parameters including disk number and sector number where one or more logical blocks of the data file are stored in the one or more physical storage systems.

Claim 22 (previously presented): The system of claim 12, wherein the physical address meta data comprises physical address parameters including disk number and sector number where one or more logical blocks of the data file are stored in the one or more physical storage systems.

Claim 23 (previously presented): The system of claim 12, wherein the routing meta data comprises next hop node addresses from the client site for each of the one or more network routes.

Claim 24 (previously presented): The system of claim 12, wherein the routing meta data comprises complete path information from the client site to the source site for each of the one or more network routes.

Claim 25 (previously presented): The machine-readable medium of claim 19, wherein the physical address meta data comprises physical address parameters including disk number and sector number where one or more logical blocks of the data file are stored in the one or more physical storage systems.

Claim 26 (previously presented): The machine-readable medium of claim 12, wherein the routing meta data comprises next hop node addresses from the client site for each of the one or more network routes.

Claim 27 (previously presented): The machine-readable medium of claim 12, wherein the routing meta data comprises complete path information from the client site to the source site for each of the one or more network routes.

EVIDENCE APPENDIX

There is no evidence submitted pursuant to 37 CFR §§ 1.130, 1.131, or 1.132 or any other evidence entered by the Examiner and relied upon by Appellant in the pending appeal. Therefore, no copies are required under 37 CFR § 41.37(c)(1)(ix) in the pending appeal.

RELATED PROCEEDINGS APPENDIX

Appellant is not aware of any decisions rendered by a court or the Board that will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal. Therefore, no copies are required under 37 CFR § 41.37(c)(1)(x) in the pending appeal.